ABSTRACT

EFFECT OF POLOXAMER 407 CONCENTRATION AND MILLING TIME ON PHYSICAL CHARACTERISTICS OF CURCUMIN NANOCRYSTAL

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Nanocrystal is drug crystals in nanometer size which is stabilized with stabilizers. The choice of stabilizer concentration is important to produce good and stable nanocrystals. Poloxamer 407 is a promising stabilizers for nanocrystals. However, proper concentration of poloxamer 407 to form small and stable nanocrystals has not been investigated yet. Hence, this study is aimed to answer that question using curcumin as model compound. 0.5 g curcumin powder was dispersed in 10 mL poloxamer 407 solution (15%, 25% and 50% w/w) and milled for 48 h using 50 mm yttrium-stabilized zirconium beads up. Samples were withdrawn at 5, 24 and 48 hours. The final nanosuspensions were stored for 2 weeks at refrigerator. Evaluation of physical characteristics were conducted to analyze particle size, shape and crystallinity of nanocrystals obtained. The particle sizes of nanocrystals curcumin obtained after 48 h milling were 103 ± 5 nm; 93 ± 2 nm; and 98 ± 2 nm for 15%, 25% and 50% w/w poloxamer 407, respectively. Particle sizes only increased less than 20 nm after 2 weeks storage. X-ray diffraction showed crystalline shape for all curcumin nanocrystals obtained.

Keywords: nanocrystal; nanosuspension; curcumin; poloxamer 407.